PATENT CLAIMS

1. A method for a recovery of zinc from zinc calcine and zinc sulphide concentrate in connection with an electrolytic precipitation of zinc, whereby a zinc sulphate solution obtained from the first leaching stage is directed via solution purification to zinc electrolysis and the iron contained in the raw materials is precipitated as jarosite, **characterised in that** leaching of zinc calcine and zinc sulphide concentrate is performed in three stages in atmospheric conditions and at a temperature between 80 $^{0}$C and the boiling point of the solution, whereby the solids and solution move countercurrently in relation to each other and the acid content of the leaching stages rises in the direction of the flow of the solids, wherein the concentrate leaching and iron precipitation take place in the second stage.

2. A method according to claim 1, **characterised in that** zinc calcine is fed to the first leaching stage, neutral leaching, where leaching is carried out in a pH range between 2 – 5.

3. A method according to claim 1 or 2, **characterised in that** zinc concentrate and the solids of the neutral leaching stage are fed to the second leaching stage and the acid content is kept in the region of 2 - 20 g/l $H_2SO_4$.

4. A method according to claim 3, **characterised in that** the acid content in the second leaching stage is kept in the region of 5 – 15 g/l.

5. A method according to any of claims 1 - 4, **characterised in that** the solids of the concentrate leaching and jarosite precipitation

stage are routed to the final stage of leaching, a conversion stage, in which the acid content is kept in the region of 25 -70 g/l $H_2SO_4$.

6. A method according to claim 5, **characterised in that** the acid content in the final leaching stage is kept in the region of 30 – 50 g/l.

7. A method according to any of claims 1 – 6, **characterised in that** the zinc calcine is leached in the neutral leaching stage using the solution containing zinc sulphates and iron sulphates taken from the concentrate leaching and jarosite precipitation stage and return acid from electrolysis.

8. A method according to claim 7, **characterised in that** oxygen and/or air is fed into the neutral leaching stage in order to oxidise the ferrous iron and precipitate it as hydroxide $Fe(OH)_3$, which co-precipitates the harmful minerals in the solution.

9. A method according to claim 8, **characterised in that** the harmful minerals are germanium and antimony.

10. A method according to any of claims 1 – 9, **characterised in that** the leaching in the concentrate leaching and jarosite precipitation stage is performed using oxygen and/or air and the acidic sulphate solution containing zinc and iron from the conversion stage.

11. A method according to any of claims 1 – 10, **characterised in that** the acid level in the concentrate leaching and jarosite precipitation stage is adjusted using return acid.

12. A method according to any of claims 1 - 11, **characterised in that** alkali or ammonium ions are fed into the concentrate leaching and

jarosite precipitation stage in order to precipitate the jarosite as alkali or ammonium jarosite, and that jarosite nuclei are recirculated within the stage.

13. A method according to any of claims 1 – 12, **characterised in that** the solids remaining from the concentrate leaching and jarosite precipitation stage, which contain undissolved ferrites, part of the concentrate and the generated jarosite, are leached in the conversion stage using oxygen and electrolysis return acid in order to leach the ferrites and end concentrate and to precipitate the dissolved iron as jarosite.

14. A method according to any of claims 1 – 13, **characterised in that** flotation is performed on the solids formed during the concentrate conversion stage in order to form sulphur concentrate.